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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,480	11/26/2003	Richard A. Golding	ARC920030082US1	7942
28211	7590	02/08/2006	EXAMINER	
FREDERICK W. GIBB, III GIBB INTELLECTUAL PROPERTY LAW FIRM, LLC 2568-A RIVA ROAD SUITE 304 ANNAPOLIS, MD 21401			BRADLEY, MATTHEW A	
			ART UNIT	PAPER NUMBER
			2187	
DATE MAILED: 02/08/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/723,480		GOLDING, RICHARD A.	
	Examiner		Art Unit	
	Matthew Bradley		2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/26/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 26 November 2003 was filed on the mailing date for application 10/723,480. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner is considering the information disclosure statement with a signed and initialed copy being attached hereto.

Claim Status

Claims 1-40 remain pending and are ready for examination.

Claim Objections

Applicant is advised that should claims 1-13 be found allowable, claims 14-26 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Jacobson et al (U.S. 5,392,244) herein after referred to as Jacobson.

As per independent claim 1, Jacobson teach,

- storing an object in an object storage device; (Column 3 lines 43-45)
- temporarily storing a duplicate of said object in a second object storage device; (Column 3 lines 40-42)
- converting said object into any of a grouped object Redundant Array of Independent Disks (RAID) layout and an individual RAID layout as said object changes in size; and (Column 7 line 65 to Column 8 line 2) *The Examiner notes that the migration policy as taught by Jacobson includes access recency or access frequency. Further as shown in Column 7 lines 35-40, the mirrored blocks occupy more space. As the blocks are accessed frequently the blocks will occupy more space at least for the reason of indicating that the blocks had been accessed. Accordingly, the system of Jacobson converts the mirrored blocks into a parity set of blocks as the object (group of blocks) change in size.*
- discarding the duplicate object (Column 7 lines 40-43).

As per dependent claim 2, Jacobson teach, determining which of said grouped object RAID layout or individual RAID layout to convert said object into based on a size of the object being converted (Column 7 lines 35-40).

As per dependent claim 3, Jacobson teach, selecting a group based on whether said group comprises other objects similarly sized to said object (Column 4 lines 39-42).

As per dependent claim 4, Jacobson teach, wherein the similarly sized objects comprise variably sized objects (Column 4 lines 39-42). *The Examiner notes that the*

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disks contain plural, equal sized storage regions (able to store similarly sized objects) wherein individual regions have multiple segments (able to store variably sized objects).

As per dependent claim 5, Jacobson teach, further comprising recomputing a parity of said group to include said object (Column 8 lines 15-20). *The Examiner notes that the addition of new blocks into the parity storage area requires a new parity calculation in order for the system to maintain parity for all of the data.*

As per dependent claim 6, Jacobson teach, wherein said RAID layout comprises any of a RAID 5, a RAID 6, and a striped RAID layout (Column 6 lines 30-32).

As per dependent claim 7, Jacobson teach, wherein said step of converting occurs when a predetermined number objects have been duplicated (Column 7 lines 65-66). *The Examiner notes that the system of Jacobson converts the mirrored storage to parity storage after at least 1 object has been written to mirrored storage. Accordingly, the system of Jacobson converts from mirrored storage to parity storage after a predetermined number of objects (1) has been duplicated.*

As per dependent claim 8, Jacobson teach, wherein said step of converting occurs when said storage devices reach a limit on storage space (Column 7 lines 35-40).

As per dependent claim 9, Jacobson teach, wherein said step of converting occurs when said object remains dormant for a predetermined period of time (Column 7 line 67 to Column 8 line 2).

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As per dependent claim **10**, Jacobson teach, wherein said step of converting to a grouped object RAID layout further comprises forming a group of similarly sized objects in said grouped object RAID layout (Column 4 lines 39-42).

As per dependent claim **11**, Jacobson teach, wherein said similarly sized objects comprise variably sized objects (Column 4 lines 39-42).

As per dependent claim **12**, Jacobson teach, further comprising removing the converted object from said grouped object RAID layout (Column 7 lines 40-43).

As per dependent claim **13**, Jacobson teach, further comprising duplicating said converted object (Column 5 lines 21-22). *The Examiner notes that as discussed supra, the system converts from mirrored storage to parity storage. The system can also convert from parity storage to mirrored storage. In an embodiment where data is often accessed frequently and then accessed less frequently but needed again, the system of Jacobson allows for the data to be converted from mirrored storage to parity storage back to mirrored storage. Accordingly, the system of Jacobson teaches the instant limitation as converting data from mirrored to parity back to mirrored thereby duplicating the converted object (data).*

As per independent claim **14**, Jacobson teach,

- storing a variably sized object in a first object storage system; (Column 3 lines 43-45) *The Examiner notes that the object being stored can be of any size, not limited to a fixed size.*
- mirroring said object; temporarily storing the mirrored object in a second object storage system; (Column 3 lines 40-42)

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- converting said object into any of a grouped object Redundant Array of Independent Disks (RAID) layout and an individual RAID layout upon growth of said object; and (Column 7 line 65 to Column 8 line 2) *The Examiner notes that the migration policy as taught by Jacobson includes access recency or access frequency. Further as shown in Column 7 lines 35-40, the mirrored blocks occupy more space. As the blocks are accessed frequently the blocks will occupy more space at least for the reason of indicating that the blocks had been accessed. Accordingly, the system of Jacobson converts the mirrored blocks into a parity set of blocks as the object (group of bocks) change in size.*
- discarding the mirrored object (Column 7 lines 40-43).

As per dependent claim **15**, Jacobson teach, determining which of said grouped object RAID layout or individual RAID layout to convert said object into based on a size of the object being converted (Column 7 lines 35-40).

As per dependent claim **16**, Jacobson teach, selecting a group based on whether said group comprises other objects similarly sized to said object (Column 4 lines 39-42).

As per dependent claim **17**, Jacobson teach, wherein the similarly sized objects comprise variably sized objects (Column 4 lines 39-42). *The Examiner notes that the disks contain plural, equal sized storage regions (able to store similarly sized objects) wherein individual regions have multiple segments (able to store variably sized objects).*

As per dependent claim **18**, Jacobson teach, recomputing a parity of said group to include said object (Column 8 lines 15-20). *The Examiner notes that the addition of*

new blocks into the parity storage area requires a new parity calculation in order for the system to maintain parity for all of the data.

As per dependent claim **19**, Jacobson teach, wherein said RAID layout comprises any of a RAID 5, a RAID 6, and a striped RAID layout (Column 6 lines 30-32).

As per dependent claim **20**, Jacobson teach, wherein said step of converting occurs when a predetermined number objects have been mirrored (Column 7 lines 65-66). *The Examiner notes that the system of Jacobson converts the mirrored storage to parity storage after at least 1 object has been written to mirrored storage. Accordingly, the system of Jacobson converts from mirrored storage to parity storage after a predetermined number of objects (1) has been mirrored.*

As per dependent claim **21**, Jacobson teach, wherein said step of converting occurs when said storage devices reach a limit on storage space (Column 7 lines 35-40).

As per dependent claim **22**, Jacobson teach, wherein said step of converting occurs when said object remains dormant for a predetermined period of time (Column 7 line 67 to Column 8 line 2).

As per dependent claim **23**, Jacobson teach, wherein said step of converting to a grouped object RAID layout further comprises forming a group of similarly sized objects in said grouped object RAID layout (Column 4 lines 39-42).

As per dependent claim **24**, Jacobson teach, wherein said similarly sized objects comprise variably sized objects (Column 4 lines 39-42).

As per dependent claim **25**, Jacobson teach, further comprising removing the converted object from said grouped object RAID layout (Column 7 lines 40-43).

As per dependent claim **26**, Jacobson teach, further comprising duplicating said converted object (Column 5 lines 21-22). *The Examiner notes that as discussed supra, the system converts from mirrored storage to parity storage. The system can also convert from parity storage to mirrored storage. In an embodiment where data is often accessed frequently and then accessed less frequently but needed again, the system of Jacobson allows for the data to be converted from mirrored storage to parity storage back to mirrored storage. Accordingly, the system of Jacobson teaches the instant limitation as converting data from mirrored to parity back to mirrored thereby duplicating the converted object (data).*

As per independent claim **27**, Jacobson teach,

- a set of object storage devices; (Figure 1 item 12 as shown in Column 2 lines 52-55)
- a variably sized object in a first object storage device; (Column 3 lines 43-45) *The Examiner notes that the object being stored can be of any size, not limited to a fixed size.*
- a redundancy data management controller operable for duplicating said object; (Column 2 lines 55-56)
- a second object storage device operable for temporarily storing the duplicated object; (Figure 1 item 12 as shown in Column 2 lines 52-55)

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- a data converter operable for converting said object into any of a grouped object Redundant Array of Independent Disks (RAID) layout and an individual RAID layout said object changes in size; and (Column 3 lines 14-28)
- a data purger operable for discarding the duplicated object (Column 3 lines 14-28). *The Examiner notes that as discussed supra, once the data is converted, the space of the old data is available for subsequent data writes.*

As per dependent claim **28**, Jacobson teach, wherein said data converter is operable for determining which of said grouped object RAID layout or individual RAID layout to convert said object into based on a size of the object being converted (Column 3 lines 14-28).

As per dependent claim **29**, Jacobson teach, wherein said grouped object RAID layout is selected based on determining whether a group comprises other objects similarly sized to said object (Column 4 lines 39-42).

As per dependent claim **30**, Jacobson teach, wherein the similarly sized objects comprise variably sized objects (Column 4 lines 39-42). *The Examiner notes that the disks contain plural, equal sized storage regions (able to store similarly sized objects) wherein individual regions have multiple segments (able to store variably sized objects).*

As per dependent claim **31**, Jacobson teach, further comprising a recomputed parity of said group to include said object (Column 8 lines 15-20). *The Examiner notes*

that the addition of new blocks into the parity storage area requires a new parity calculation in order for the system to maintain parity for all of the data.

As per dependent claim **32**, Jacobson teach, wherein said RAID layout comprises any of a RAID 5, a RAID 6, and a striped RAID layout (Column 6 lines 30-32).

As per dependent claim **33**, Jacobson teach, wherein said data converter is triggered when a predetermined number objects have been duplicated (Column 7 lines 65-66). *The Examiner notes that the system of Jacobson converts the mirrored storage to parity storage after at least 1 object has been written to mirrored storage. Accordingly, the system of Jacobson converts from mirrored storage to parity storage after a predetermined number of objects (1) has been duplicated.*

As per dependent claim **34**, Jacobson teach, wherein said data converter is triggered when said storage devices reach a limit on storage space (Column 7 lines 35-40).

As per dependent claim **35**, Jacobson teach, wherein said data converter is triggered when said object remains dormant for a predetermined period of time (Column 7 line 67 to Column 8 line 2).

As per dependent claim **36**, Jacobson teach, wherein said grouped object RAID layout further comprises a group of similarly sized objects in said grouped object RAID layout (Column 4 lines 39-42).

As per dependent claim **37**, Jacobson teach, wherein said similarly sized objects comprise variably sized objects (Column 4 lines 39-42).

Claim 38 is interpreted under 35 U.S.C. 112, 6th paragraph with system/structure means as noted infra.

As per dependent claim **38**, Jacobson teach, means for removing the converted object from said grouped object RAID layout (Column 7 lines 40-43).

As per dependent claim **39**, Jacobson teach, wherein said redundancy data management controller is operable for duplicating said converted object (Column 5 lines 21-22). *The Examiner notes that as discussed supra, the system converts from mirrored storage to parity storage. The system can also convert from parity storage to mirrored storage. In an embodiment where data is often accessed frequently and then accessed less frequently but needed again, the system of Jacobson allows for the data to be converted from mirrored storage to parity storage back to mirrored storage. Accordingly, the system of Jacobson teaches the instant limitation as converting data from mirrored to parity back to mirrored thereby duplicating the converted object (data).*

Claim 40 is interpreted under 35 U.S.C. 112, 6th paragraph.

The Court of Appeals for the Federal Circuit, in its en banc decision *In re Donaldson Co.*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994), decided that a "means-or-step-plus-function" limitation should be interpreted in a manner different than patent examining practice had previously dictated. The Donaldson decision affects only the manner in which the scope of a "means or step plus function" limitation in accordance with 35 U.S.C. 112, sixth paragraph, is interpreted during examination. Donaldson does not directly affect the manner in which any other section of the patent statutes is interpreted or applied.

When making a determination of patentability under 35 U.S.C. 102 or 103, past practice was to interpret a "means or step plus function" limitation by giving it the "broadest reasonable interpretation." Under the PTO's long-standing practice this meant interpreting such a limitation as reading on any prior art means or step which performed the function specified in the claim without regard for whether the prior art means or step was equivalent to the corresponding structure, material or acts described in the specification. However, in Donaldson, the Federal Circuit stated:

Per our holding, the "broadest reasonable interpretation" that an examiner may give means-plus-function language is that statutorily mandated in paragraph six. Accordingly, the PTO may not disregard the structure disclosed in the specification corresponding to such language when rendering a patentability determination. (MPEP 2181)

Accordingly, the Examiner notes that the means or system/structure for practice of the invention disclosed in paragraph 0035 of applicant's specification is further taught in Jacobson in column 2 line 52 to column 3 line 42.

As per independent claim **40**, Jacobson teach,

- means for storing a variably sized object in a first object storage system;
(Figure 1 item 12 as shown in Column 2 lines 52-55)
- means for mirroring said object; (Column 2 lines 55-56)
- means for temporarily storing the mirrored object in a second object storage system; (Figure 1 item 12 as shown in Column 2 lines 52-55)
- means for converting said object into any of a grouped object Redundant Array of Independent Disks (RAID) layout and an individual RAID layout upon growth of said object; and (Column 3 lines 14-28)
- means for discarding the mirrored object (Column 3 lines 14-28). *The Examiner notes that as discussed supra, once the data is converted, the space of the old data is available for subsequent data writes.*

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. U.S. 6,571,314 Komachiya et al teach a system capable of changing the redundancy method.
2. U.S. 2004/0172503 Merchant teaches an adjustable storage system.
3. U.S. 2004/0133743 Ito et al teach an apparatus for changing RAID levels.

4. U.S. 2003/0188097 Holland et al teach a data migration system from mirrored storage to parity storage.

5. U.S. 2002/0112118 Komachiya et al teach a method and apparatus for changing of a raid level in disk array systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Bradley whose telephone number is (571) 272-8575. The examiner can normally be reached on 6:30-3:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DAS/mb



DONALD SPARKS
SUPERVISORY PATENT EXAMINER